

The opinion in support of the decision being entered today was not written for publication and is not binding precedent of the Board.

**UNITED STATES PATENT AND TRADEMARK OFFICE**

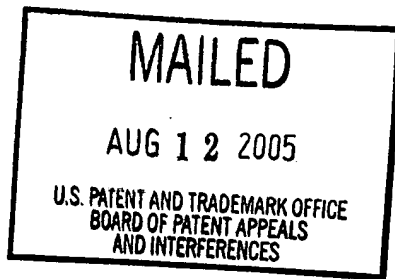
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**BEFORE THE BOARD OF PATENT APPEALS  
AND INTERFERENCES**

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Ex parte KENNETH D. CEOLA

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Appeal No. 2005-2170  
Application No. 09/538,785

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ON BRIEF

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Before FRANKFORT, NASE, and BAHR, Administrative Patent Judges.  
NASE, Administrative Patent Judge.

DECISION ON APPEAL

This is a decision on appeal from the examiner's final rejection of claims 1 to 14, which are all of the claims pending in this application.<sup>1</sup>

We REVERSE.

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<sup>1</sup> Claim 1 was amended subsequent to the final rejection.

BACKGROUND

The appellant's invention provides a safer safety and arming device which utilizes a magnetic sensor to determine two or more events, such as muzzle exit, spin rate, and count turns, and also ensures that the determined events occur in the correct order and at the expected time. The magnetic sensor data may also be combined with other events, such as setback to substantially increase the safety of gunfired fuze systems (specification, p. 2). A substantially correct copy of the claims under appeal is set forth in the appendix to the appellant's brief.<sup>2</sup>

The prior art references of record relied upon by the examiner in rejecting the appealed claims are:

Ziembra	3,608,494	Sept. 28, 1971
Kurschner et al.	5,497,704	Mar. 12, 1996
(Kurschner)		

Claims 1 to 6 stand rejected under 35 U.S.C. § 102(b) as being anticipated by Kurschner.

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<sup>2</sup> The copy of claim 1 set forth in the appendix to the appellant's brief does not reflect the amendment after final of claim 1.

Claims 7 to 14 stand rejected under 35 U.S.C. § 103 as being unpatentable over Kurschner.

Claims 1 to 14 stand rejected under 35 U.S.C. § 103 as being unpatentable over Kurschner in view of Ziemba.

Rather than reiterate the conflicting viewpoints advanced by the examiner and the appellant regarding the above-noted rejections, we make reference to the final rejection (mailed December 11, 2001), the answer (mailed August 5, 2002) and the supplemental answer (mailed December 22, 2004) for the examiner's complete reasoning in support of the rejections, and to the brief (filed May 21, 2002) and reply brief (filed October 4, 2002) for the appellant's arguments thereagainst.

#### OPINION

In reaching our decision in this appeal, we have given careful consideration to the appellant's specification and claims, to the applied prior art references, and to the respective positions articulated by the appellant and the examiner. As a consequence of our review, we make the determinations which follow.

### **The anticipation rejection**

We will not sustain the rejection of claims 1 to 6 under 35 U.S.C. § 102(b) as being anticipated by Kurschner.

Anticipation is established only when a single prior art reference discloses, expressly or under the principles of inherency, each and every element of a claimed invention. RCA Corp. v. Applied Digital Data Sys., Inc., 730 F.2d 1440, 1444, 221 USPQ 385, 388 (Fed. Cir. 1984). In other words, there must be no difference between the claimed invention and the reference disclosure, as viewed by a person of ordinary skill in the field of the invention. Scripps Clinic & Research Found. v. Genentech Inc., 927 F.2d 1565, 1576, 18 USPQ2d 1001, 1010 (Fed. Cir. 1991).

Claim 1, the only independent claim subject to this ground of rejection, reads as follows:

A safety and arming fuze apparatus for use with a projectile,  
comprising:  
a magnetic sensing apparatus for determining the occurrence of at least two of the events selected from the group consisting of muzzle exit, a predetermined spin rate, and a predetermined number of turns,  
whereby upon the occurrence of the at least two events the fuze is armed.

Kurschner's invention relates to the field of fuzes and more particularly, to an apparatus and method for control of a projectile with fuze functions including magnetically sensing ballistic spin parameters and computing muzzle velocity for accurately controlling range to burst of a projectile (i.e., detonation). Kurschner's invention is a sensor for a class of projectile fuzes for use in artillery rounds, tank rounds, medium caliber bullets of all sizes, and individually carried combat weapons. The functions inherent in his fuze include those required by present standards and further include several other functions not available with prior art fuzes and are all accomplished with a single magnetic sensor element. In particular, internal turns counting is provided so that a turns-to-burst detonation mode is possible. The revolutions per second or turns of the projectile are counted and the detonation of the projectile is based on this count. Another related function of the invention is the determination of muzzle velocity based on turns counting, which allows for calculation of what has always been an indeterminate measurement. The determination of muzzle velocity allows for compensation of the fire control systems count estimate of the turns-to-burst, which is based on a nominal assumed muzzle velocity, by modifying the turns-to-burst count based on the actual muzzle velocity measurement.

Kurschner teaches (column 7, lines 31, to column 8, line 50) that:

Once data has been communicated to the fuze 16, muzzle exit is detected. This function is represented by block 52 (shown in FIG. 7). As discussed above, muzzle exit is determined using the transducer 20. The ferrous confinement in the gun barrel shields the transducer from the earth's magnetic field and upon exit an abrupt magnetic field transition is generated. The transducer senses this abrupt magnetic field transition and uses this sensing of muzzle exit as the starting point for the countdown to detonation. In other words, at muzzle exit, the time is set to zero and the turns count is set to zero. The count for time-to-burst, turns-to-burst or both is then started.

The muzzle exit signal also serves as a true electronic second environment confirmation, as would be known by those skilled in the art. The signal starts a timer which determines a safe separation distance for the projectile.

After muzzle exit has been determined, the spin rate is measured as represented by block 54. The spin rate is measured in the first few meters of travel. In order to measure spin rate the number of turns must be counted. Referring now to FIG. 6, block 56 of the fuze 16 counts turns. The turns are sensed by the transducer as described earlier. The signals are amplified and filtered 58 and the zero crossings are detected at 60 which drives logic 62 where the turns are counted. The time, time and/or turns to burst, and fuze mode are also input to the logic processor 62.

. . . In other words, knowing that the projectile will turn a predetermined number of times per unit distance, the number of turns over a measured time allows calculation of the actual muzzle velocity.

Referring again to FIG. 7, block 64 represents the calculation of the muzzle velocity based on spin rate. The muzzle velocity is calculated by the logic processor 62. At this point, block 64 also adjusts the range parameter based on the muzzle velocity calculation. This function is performed by logic processor 62. The time-to-burst or turns-to-burst may be adjusted. The logic processor 62 includes look up tables or data which, based on the actual velocity, indicates the adjustment to the time or turns. . . .

The final step is illustrated by block 66. The fuze initiates burst at proper range in block 66. The signal is transmitted from the logic processor 62 to the

firing circuit 68. The firing circuit 68 is conductively connected to the detonator 70 for detonation of the projectile.

We agree with the appellant that the subject matter of claim 1 is not anticipated by Kurschner. Simply put, Kurschner's invention is directed to detonation of the fuze, not to the arming of the fuze. One skilled in the art would have readily understood Kurschner's fuze to be armed by a first environment, usually setback acceleration and the muzzle exit signal determined by magnetic transducer 20 which serves as the second environment confirmation. Kurschner teaches the use of magnetic transducer 20 to count turns, to determine spin rate, and to determine muzzle velocity only for controlling detonation of the fuze. Kurschner does not teach or suggest using either turn count or spin rate in arming the fuze.

For the reasons set forth above, the decision of the examiner to reject claim 1, and claims 2 to 6 dependent thereon, under 35 U.S.C. § 102(b) is reversed.

**The obviousness rejection based on Kurschner**

For the reasons set forth above with regard to claim 1, we will not sustain the rejection of claims 7 to 9 under 35 U.S.C. § 103 as being unpatentable over Kurschner.

In that regard, Kurschner does not teach or suggest using either turn count or spin rate in arming the fuze.

We likewise will not sustain the rejection of claims 10 to 14 under 35 U.S.C. § 103 as being unpatentable over Kurschner.

Claim 10, reads as follows:

A method for safing and arming a projectile, the steps comprising:  
a) determining the occurrence of at least two of the events selected from the group consisting of muzzle exit, a predetermined spin rate, and a predetermined number of turns,  
b) arming the fuze.

In the Board remand (mailed April 21, 2004), the previous panel<sup>3</sup> pointed out that method claim 10, unlike apparatus claim 1, does not require arming of a fuze "upon the occurrence" of the at least two events of step (a). This panel reaches a somewhat opposite conclusion. In our view, claim 10 does require step (b) (arming the fuze) to occur subsequent to step (a) (determining the occurrence of at least two of the events selected from the group consisting of muzzle exit, a predetermined spin rate, and a predetermined number of turns). We reach this conclusion from a consideration of

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<sup>3</sup> Administrative Patent Judges Cohen and Staab retired before this case was reached for decision on the merits.



claim 10 as a whole. In this regard, claim 10 is directed to a method for safing and arming a projectile. In a method for safing and arming a projectile the step of determining the occurrence of at least two of the events selected from the group consisting of muzzle exit, a predetermined spin rate, and a predetermined number of turns, would only be part of that method if it came prior to arming the fuze. If the step of determining the occurrence of at least two of the events selected from the group consisting of muzzle exit, a predetermined spin rate, and a predetermined number of turns, came after the arming of the fuze it would not be part of a method for safing and arming a projectile.

For the reasons set forth above with regard to claim 1, the subject matter of claim 10, and claims 11 to 14 dependent thereon, is not anticipated by Kurschner. Kurschner's invention is directed to detonation of the fuze, not to the arming of the fuze. Kurschner teaches the use of magnetic transducer 20 to count turns, to determine spin rate, and to determine muzzle velocity only for controlling detonation of the fuze. Kurschner does not teach or suggest using either turn count or spin rate in arming the fuze.

For the reasons set forth above, the decision of the examiner to reject claims 7 to 14 under 35 U.S.C. § 103 as being unpatentable over Kurschner is reversed.

**The obviousness rejection based on Kurschner and Ziemba**

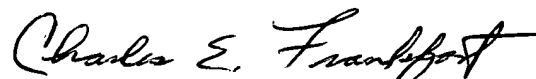
We have also reviewed the reference to Ziemba additionally applied in the rejection of claims 1 to 14 but find nothing therein which makes up for the deficiency of Kurschner discussed above with respect to independent claims 1 and 10. Accordingly, we cannot sustain the examiner's rejection of claims 1 to 14 under 35 U.S.C. § 103 as being unpatentable over Kurschner in view of Ziemba.

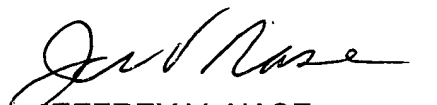
**CONCLUSION**

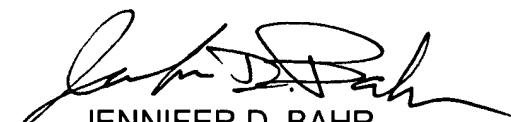
To summarize, the decision of the examiner to reject claims 1 to 6 under 35 U.S.C. § 102(b) as being anticipated by Kurschner is reversed; the decision of the examiner to reject claims 7 to 14 under 35 U.S.C. § 103 as being unpatentable over

Kurschner is reversed; and the decision of the examiner to reject claims 1 to 14 under 35 U.S.C. § 103 as being unpatentable over Kurschner in view of Ziemba is reversed.

REVERSED

  
CHARLES E. FRANKFORT  
Administrative Patent Judge

  
JEFFREY V. NASE  
Administrative Patent Judge

  
JENNIFER D. BAHR  
Administrative Patent Judge

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Appeal No. 2005-2170  
Application No. 09/538,785

Page 12

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SUITE 2000  
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